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ABSTRACT

The problem of educational evaluation, the various types of evaluation, and the different kinds of models of evaluation systems are discussed in some detail. The educational needs of the students, staff, community, and the Philadelphia Title I schools, as agreed by members of the evaluation team, are listed. A taxonomy of Title I evaluation is formulated, and then mathematical formulas for individual project evaluation and overall cost-effect comparison are developed. (DG)

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The Philadelphia Model for Title I Evaluation*

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THE PHILADELPHIA MODEL FOR TITLE I EVALUATION

I. Introduction

A. Statement of the Problem

The conceptual base underlying educational evaluation needs to be stated at the onset. Conceptualizations used here may be divided into two classes: 1. Conceptions of the nature of evaluation; in general, and as related to specific classes of educational programs; and, 2. Conceptions of a model of evaluation systems needed to conduct educational evaluations.

Although industrial and military organizations have developed appropriate system models for evaluating success around tangible products, there are few adequate conceptualizations of decision-making processes and their associated information requirements in education. At present, there are at least two approaches to evaluation in education; namely, formative and summative evaluation. Formative evaluation serves individual project administrators and summative evaluation provides comparative information about projects for central administration decisions.

The major aim of this paper is to develop an evaluation model that is appropriate to education in the Philadelphia School System. A word of caution is in order. When one borrows techniques such as systems evaluation from other disciplines, he must be sure that those techniques are applicable to the problems under consideration. Acknowledging potential shortcomings in a totally mechanistic model, the adaption recommended is one which accounts for the specific environment of urban education.

B. Evaluation Defined

Evaluation means the provision of information through formal means, such as experimental research, survey research and the use of judgmental analyses to supply rational bases for making judgments which are inherent in decision situations. Several levels of decision-making are constantly in process where educational projects operate. Each requires a different kind of information. Two levels of decision are most crucial for probable success of a project. At the central administration level, information must be provided which will permit enlightened funding decisions. At the project operational level, information which is required to help field administrators achieve or alter stated goals and purposes must be supplied.

C. Nature of Evaluation

In the evaluation of educational programs containing many varied projects aimed a comprehensive approach to major problems in education, there are at least two major kinds of evaluation proposed in related literature. These two evaluation activities lend themselves to different purposes.

1. Individual Project Evaluation.

As projects develop, their administrators require help in defining behavioral objectives and in measuring those objectives. The evaluators provide conceptual and technical services within projects at this stage.

Also, when projects are clearly formulated and functioning, project administrators require further evidence of uniformity and disparity of operations within treatments. Evaluators here act as a feedback system in designing and in evaluating process instruments.

2. Overall Projects Evaluation.

It is always desirable from the central administration vantage to know which projects are likely to provide the most effect for dollars expended. This summative evaluation has three major comparative aspects. They are (a) input evaluation, (b) process evaluation, and (c) output evaluation.

(a) Input Evaluation

In conducting an input evaluation, an attempt is made to determine the relevance of the project to the needs of the students, staff, community, and the innovation in the School District of Philadelphia.

This is done by drawing information about the needs of the School District of Philadelphia from our pupil contacts with all levels of school personnel and by reviewing data in many of the records of school personnel by the Federal Evaluation staff. From this a summative input judgmental model can be developed and used to assess 35 individual projects.

(b) Process Evaluation

The purpose of process evaluation is to monitor the project to learn what was done and to provide information to the project manager and his staff so that they may improve project quality while it is being conducted.

The process evaluation will be done by employing an instrument of our own design. It is in the general form of a check list allowing the evaluator to tabulate certain critical aspects of the projects' performance.

(C) Output Evaluation

The Output evaluation seeks to determine to what extent the stated objectives have been accomplished.

The output evaluation will generally consist of pre and post tests. These two tests will be related by a statistical design. The data gathered in the pre and post test will come from questionnaires, surveys, interaction analyses, tests, etc.

D. The Nature of The Model

The model may be defined as a representation of the system under study, a representation which may be used in predicting the effect on the system's effectiveness of possible changes in the system.

There are three types of models which could be used in educational evaluation: an iconic model, an analogue model and a symbolic model. An iconic model pictorically or visually represents what the system looks like as does a photograph or a school model. An analogue model employs one set of properties to represent some other set of properties the same as this system being studied possess. Graphs are very simple analogies. In graphs we use distance to represent such properties as time, number, per cent, age, weight and many other properties. A symbolic model is one which employs symbols to designate properties of the systems under study by means of a mathematical equation or a set of such equations. Of the three types of models to be considered, the iconic, analogue, and symbolic, the latter is of particular importance. By proper mathematical or logical operations, the symbolic model can be used to formulate a solution to the problem at hand.

The model presented in this paper is a symbolic model and an analogue model as well.

E. Educational Needs In Philadelphia Title I Schools

The educational needs in the Title I schools in the School District of Philadelphia include the needs of students, staff, community, and the need for innovation and creativity by the district as a whole. The needs of the students may be defined as the needs of the educationally deprived children in the School District of Philadelphia. Staff needs include support in terms of facilities and materials and in-service training in working with inner city children. The needs of the community will be defined as the need for the adult involvement in the schools. Finally, the need for innovation and creativity means the need for changing the operation of the schools to accommodate an environment more conducive to learning.

The following are the general agreements among the members of The Title I evaluation teams about the needs of students, staff, community and the needs for innovation and creativity for Title I schools in the School District of Philadelphia.

1. Students Needs

   a. Improvement in basic skills (including communication and computation)
   b. Opportunity for learning vocational skills
   c. Development of self-awareness, self-concept, positive attitudes and task persistence
   d. Increased sensitivity to culture and society (including use of leisure time)
   e. Texts and materials

2. Staff Needs

   a. Improvement of formal qualifications
   b. Exploration of role perception including motivation, professional pride, awareness of student and community needs
   c. Knowledge of advanced methodological improvements and training
   d. Provision for paraprofessional assistance (record keeping)
   e. Additional facilities and resources

3. Community Needs

   a. Increased communication with and perception of the needs of the school
   b. Increased community support for school programs
   c. Increased use of school facilities and school personnel for community purposes
   d. Increased advisory and consultative services
   e. Improved security for both students and property

4. Innovation and Creativity Needs of the District at Large

   a. Reexamination and revision of curriculum content
   b. Improved teaching strategies
   c. Improved learning strategies
   d. Improved school system support logistically
   e. Improved methods for community involvement

F. Scope and Limitation

The scope of the present model is limited to an evaluation of Title I projects in the School District of Philadelphia of the year 1968-1969. In this evaluation, we deal with the criteria of validity and desirability only, although we are concerned with understanding that the context of evaluation should include the criteria of fakability (to determine whether the provided information is truthful or correct), probability (to determine whether the accomplishment of the program is feasible or not), and reliability (to decide whether the information is reproducible and the program activity is replicable).

II. The Philadelphia Evaluation Model

Because of the complexity of the various projects and the fact that overall comparisons must be made among the projects, the evaluation model has two major divisions. (1) an individual project evaluation model, and (2) an overall cost-effect comparable model.

A. The Individual Project Evaluation Model

The basic model for individual project evaluation is a form of

$$I = f(Ai, Bi, Ci,)$$

Where I = The improvement in the effectiveness of the project
Ai = The input effectiveness
Bi = The process effectiveness
Ci = The output effectiveness
f = The functional relationship between the independent variables (Ai, Bi, Ci), and the dependent variable

The individual project evaluation breaks down into 3 components--input, process, and output evaluation. For each of these components (see chart I) there is a series of five steps: objective, method, result, discussion, and conclusion. For each component, one continues to go through the series of steps until one becomes satisfied with the design for each step.

More specifically, this model is of the matrix form. Along the horizontal axis are the three types of evaluation that are involved--input, process, and output. Along the vertical axis are the five steps, objectives, method, results, discussion, and conclusion that are part of each type of evaluation.

This produces fifteen cells, each representing steps. Please see the accompanying chart to ascertain the exact nature of each step. (see Chart II).

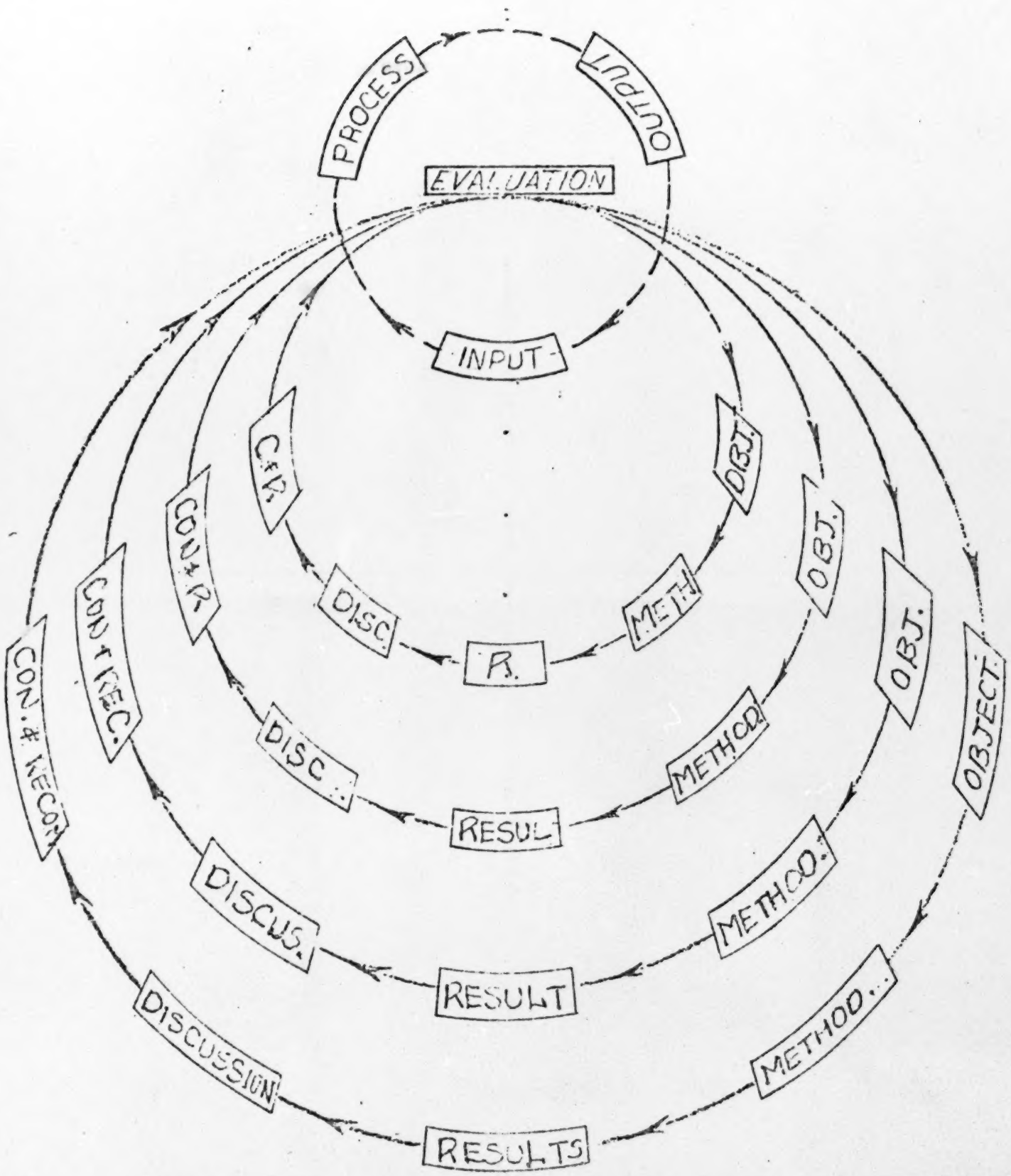
In addition to the input, process, and output evaluation, the descriptions of the objectives, method, results, discussion and conclusions are as follows:

1. Objectives

This part of evaluation includes three steps:

First, identify the terminal behavior by name and specify the kind of behavior that will be accepted as evidence that the project has achieved the objectives.

Chart I


PROCESS
OUTPUT
EVALUATION
INPUT
C.&R.
OBJ.
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R.
METH.
CON.&REC.
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DISCUSSION
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THE PHILADELPHIA EVALUATION MODEL

--A TAXONOMY OF TITLE I EVALUATION--

	INPUT	PROCESS	OUTPUT
OBJECTIVES	Determine the relevance of the project to the needs of the students, staff, community, and innovation in Philadelphia School District.	Monitor and feedback information	Determine extent of change in attitudes and/or behavior in groups being tested.
METHOD	Evaluators judge on 1-5 scale against the four dimensions, (20 items) in the School District of Philadelphia.	Observation, use Philadelphia Check-List.	Test, surveys, questionnaires, interviews.
RESULTS	Either is or is not relevant to the need of students, staff, community, and or innovation need in the School District of Philadelphia.	Given comments on adequacy of procedure improvement over time.	Extent to which changes have occurred in various groups along certain dimensions.
DISCUSSION	Point out, if any limitation and implication of results.	Point out, if any limitation and implication of results.	Point out, if any limitation and implication of results.
CONC. AND RECOM.	Report the summary of the conclusion and recommendation in the area of input evaluation.	Report the summary of the conclusion and recommendation in the phase of process evaluation.	Report the summary of the conclusion and recommendation in the area of output evaluation.

CHART II

Second, define the desired behavior further by describing the important condition under which the behavior will be expected to occur.

Third, specify the criteria of acceptable performance by describing how well the project must perform to be considered acceptable.

In reports of theory-testing experiments, the exposition should state the theoretical propositions from which the hypotheses to be tested are derived, give the logic of their derivation, summarize the relevant arguments and data, and state the hypotheses.

2. Method

Method is described in enough detail to permit the reader to repeat the experiment unless portions have been described in other reports which can be cited. This section describes the design of the research, the logic of relating empirical data to the theoretical propositions, the subjects, the sampling and control devices, the techniques of measurement, and any apparatus used.

3. Results

The section on results gives enough data to justify the conclusions. Special attention is given to tests of statistical significance and to the logic of inferences and generalizations from empirical observations.

a. Evaluators are cautioned against inferring trends from data which fail by small margins to meet the level of significance adopted. Such results are most economically interpreted as a function of chance and should be reported as non-significant.

b. When a study reports the predictive validity of a method of measurement, the results must always show the degree of relationship between the measure and the criterion, and its practical value. The relationship is reported in such terms as coefficients of correlation, or expectancy tables. It is not sufficient merely to show that the relationship is nonchance in terms of the level of significance.

4. Discussion

The discussion points out the limitations of the conclusions, notes correspondence of differences between the findings and widely accepted points of view, and briefly gives the implications for theory or practice.

Reports of evaluation resulting in negative or unexpected findings do not end with long discussions of possible reasons for the outcome. Brief discussion is appropriate.

5. Conclusions and Recommendations

The report ends with a brief formal summary of the problem, the results, the conclusions, and recommendations.

B. The Overall Cost-Effect Comparison Model

Because of the differences in emphasis of the various Title I projects an overall cost-effect comparable model has been developed so that some meaningful comparisons can be made among all of these projects. The basic model for the overall cost-effect comparison is a form of

$$V = f\ (Xi, Yi)$$

Where V = the measure of the value of the program
Xi = the variable of money spent
Yi = the variable of effect obtained
f = the function relationship between independent variables, (Xi and Yi), and the dependent variable V.

The model is divided into four major dimensions each containing five sub-categories, thus providing twenty items upon which projects may be compared. They are as follows:

1. Students Needs

   a. Improvement in basic skills (including communication and computation)
   b. Opportunity for learning vocational skills
   c. Development of self-awareness, self-concept, positive attitudes and task persistence
   d. Increased sensitivity to culture and society (including use of leisure time)
   e. Texts and materials

2. Staff Needs

   a. Improvement of formal qualifications
   b. Exploration of role perception including motivation, professional pride, awareness of student and community needs
   c. Knowledge of advanced methodological improvements and training
   d. Provision for paraprofessional assistnace (record keeping)
   e. Additional facilities and resources

3. Community Needs

   a. Increased communication with and perception of the needs of the school
   b. Increased community support for school programs
   c. Increased use of school facilities and school personnel for community purposes
   d. Increased advisory and consultive services
   e. Improved security for both students and property

4. Innovation and Creativity Needs of the District at Large

   a. Reexamination and revision of curriculum content
   b. Improved teaching strategies
   c. Improved learning strategies
   d. Improved school system support logistically
   e. Improved methods for community involvement

The input and output for each project will be rated following the above model. For each of the twenty items a judgement will be made as to the relevance of the project on a five point scale ranging from Very Low Relevance through Very High Relevance. The ratings will be made by personnel who are attuned to the problems and needs of the School District (including researchers, project administrators, and supervisory personnel). The sum of these ratings for each of the four dimensions, student, staff, community, and innovation; will then be used in determining the overall effect rating of the project from the input. The Output rating will judge to what extent the project objectives are being accomplished. A third rating to be made will be a process rating. This will reflect the amount of congruence between the project "as planned" and the project "as carried out." When these three measures are obtained, an overall rating will be made through the use of the following equations:

$$I = C_1\left(W_1 \sum_{i=1}^{M}\sum_{j=1}^{N} S_{ij} + W_2 \sum_{i=1}^{M}\sum_{j=1}^{N} T_{ij} + W_3 \sum_{i=1}^{M}\sum_{j=1}^{N} C_{ij} + W_4 \sum_{i=1}^{M}\sum_{j=1}^{N} N_{ij}\right)$$

$$\phi = C_2\left(\sum_{i=1}^{M}\sum_{j=1}^{N} G_{ij}\right)$$

$$P = C_3\left(\sum_{i=1}^{M}\sum_{j=1}^{N} P_{ij}\right)$$

$$E = W'_5 I + W'_6 P + W'_7 \phi$$

Where
- E = Effect Index
- I = Input Index
- ϕ = Output Index
- P = Process Index
- P_{ij} = Process Rating

S_{ij}= Input Student Rating

T_{ij}= Input Staff Rating

C_{ij}= Input Community Rating

N_{ij}= Input Innovation Rating

G_{ij}= Output Rating, the percentage of the accomplished objectives to total objectives

C_1, C_2, C_3 = Constant for input index, process index, output index

N = Number of Raters

M = Number of Projects

W_1, W_2, W_3, W_4 = Weight for input student rating, for input staff rating; for input community rating; for input innovation rating

W_5, W_6, W_7 = Weight for input index, process index, output index

Because the interval of the rating scale may not be equal, standard score scales have been developed to serve this purpose. The standard scores of the Effect Index would be computed from the following equation.

$$SE = \frac{E - ME}{\sigma E} \times 100 + 500$$

Where ME = Mean of the Effect Index

σE = The standard deviation of the Effect Index

SE = The standard score of the Effect Index

In addition to the project effect index, the project cost index may be obtained by the following equation.

C = (PCI/SAI)

Where PCI = Project Cost for given project

SAI = Number of students affected for given project

However, the number of students effected for the given project needs to be further defined. This can be computationally defined using the following equations.

1. For General Projects

$$SAI = H \times W$$

Where SAI = Students Affected
H = Student's hours per day in the project
W = Days per school year of this project

2. For Staff Development Project

$$SAI = H \times W \times Ta$$

Where SAI = Students Affected
H = Participant's hour per day in this project
W = Days per school year of this project
Ta = The number of student's hour per participant's hours in this project

The standard scores of the Cost Index could be computed from the following equation following the rational behind the standard score used in computing the Effect Index.

$$SC = \frac{CC - MC}{\sigma C} \times 100 + 500$$

Where CC = Cost Index

MC = Mean of the Cost Index

σC = Standard deviation of Cost Index

SC = Standard score of the Cost Index

Finally, the Cost-Effect Index may be produced by dividing the Effect Index by the Cost Index as in the following equation.

$$CE = SE/SC \times 100$$

This index may be used as one measure of Cost-Effect of the projects. (See Chart III)

III. Conclusior

These models were developed over a period of several months. An attempt was made to develop a model for an individual project evaluation which has been traditionally considered to be a part of evaluation, and a model for overall project comparisons which could provide the information for the central administration to know which projects are likely to provide the most effect for dollars spent. It was developed for use in the 1968-69 school year, but experience, changes in the magnitude and scope of the evaluation job, changes in the school district by things such as decentralization, etc. may necessitate modifications in the model for the year of 1969-70.

CHART III

THE OVERALL COST-EFFECT OF TITLE I PROJECTS

PROJECT No.	INPUT					PROCESS	OUTPUT	Grand Total Effect	Cost Per Student	Cost Effect Index
	Child	Staff	Comm.	Innov.	Total					
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
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